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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|------------------------|------------------|
| 10/797,779 | 03/09/2004 | Kejun Zeng | TI-36626 | 4149 |
| 23494 | 7590 | 02/28/2005 | EXAMINER | |
| TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265 | | | EDMONDSON, LYNNE RENEE | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1725 | |

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/797,779 | ZENG, KEJUN | |
| | Examiner | Art Unit | |
| | Lynne Edmondson | 1725 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 09 March 2004.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-15 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-15 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 10 June 2004 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-6 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of copending Application No. 10/922037. Although the conflicting claims are not identical, they are not patentably distinct from each other because both teach a semiconductor device comprising a chip, substrate, pads and interconnect material comprising a ternary alloy of between about 1.5 and 1.7% Ag (instant claims, up to 1.62% Ag, '037 claims), between 36 and 38% Pb (instant claims, about 37.7% Pb, '037 claims), and between 60.3 and 62.5% Sn (instant claims, about 61% Sn, '037 claims). Although the amounts are not identical, all of the '037 compositions fall within the ranges of the instant compositions.

It would have been obvious to one of ordinary skill in the art at the time of the invention that although the amounts are not identical, the ranges overlap and would therefore form the same interconnect material with the same properties.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Schmatz (USPN 3855679).

Schmatz teaches a solder alloy comprising about 0.5-2.5% Ag, Sn and Pb (col 4 lines 50-67).

5. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Sawayama et al. (USPN 6214636 B1).

Sawayama teaches a solder alloy comprising about 1.7% Ag (2%) , approximately 36% Pb and approximately 62% Sn (col 25 lines 30-36).

6. Claims 5, 8, 9 and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Stankavich et al. (USPN 5803344).

Stankavich teaches a method of semiconductor assembly comprising the steps of providing a chip with a Sn/Pb solder bump, proving a Sn/Ag paste and reflowing (col 4 lines 20-54 and col 5 lines 15-42) wherein the solder paste comprises about 3% Ag (col 5 lines 59-67). The melting temperature is determined by the alloy, with a typical range between 183 C and 350 C (col 5 line 59 – col 6 line 15).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 6, 7, 10, 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stankavich et al. (USPN 5803344) in view of Sawayama et al. (USPN 6214636 B1).

Stankavich teaches a method of semiconductor assembly comprising the steps of providing a chip with a Sn/Pb solder bump, proving a Sn/Ag paste and reflowing (col

4 lines 20-54 and col 5 lines 15-42) wherein the solder paste comprises about 3% Ag (col 5 lines 59-67). The melting temperature is determined by the alloy, with a typical range between 183 C and 350 C (col 5 line 59 – col 6 line 15). However the alloy is not further disclosed.

Sawayama teaches a solder alloy comprising about 1.7% Ag (2%) , approximately 36% Pb and approximately 62% Sn (col 25 lines 30-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention that with similar starting alloys and heating conditions a similar final alloy would be produced.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tanahshi et al. (USPN 6142363), Hoffmeyer et al. (USPN 6300578 B1) and Shimizu et al. (US 2001/0028109 A1).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (571) 272-1172. The examiner can normally be reached on Monday through Thursday from 6:30 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lynne Edmondson
Primary Examiner
Art Unit 1725

LRE

LYNNE R. EDMONDSON
PRIMARY EXAMINER

ULG
2/24/05